

REFERENCE

- EISENBERG, J. F., MCKAY, GEORGE M. & JAINU-DEEN, M. R. (1971): Reproductive behaviour of the Asiatic elephant (*Elephas maximus maximus* L.). *Behaviour* 38: 193-225.

4. ADDITIONAL RANGE INHABITED BY BHARAL (*PSEUDOIS NAYAUR*) AND SNOW LEOPARD (*PANTHERA UNCIA*) IN NEPAL

We provide further information on the distribution of bharal (*Pseudois nayaur*) and snow leopard (*Panthera uncia*) in Nepal. Observations, incidental to trekking activities, were made during 1977-1978.

Both bharal (*Pseudois nayaur*) and snow leopard (*Panthera uncia*) have been subjects of recent popular accounts (Matthiessen 1978, Schaller 1979) and scientific reviews (Schaller 1973, 1977; Jackson 1979). Bharal occur mainly north of the central Himalayan massifs in Nepal and are largely limited to alpine areas west of the Kali Gandaki River (Schaller 1977). Snow leopard broadly overlap bharal in distribution (Schaller 1977, Jackson 1979), except in east Nepal where bharal distribution is more limited (Schaller 1977).

Schaller and Matthiessen saw bharal along the Seng Khola between Dhorpatan and Tarkot (Matthiessen 1978, Schaller 1979) and Wilson (in Jackson 1979) reported them as abundant in the former locality. However, we travelled those areas north to Phoksumdo Taal (Ringmo Lake) in November 1977 with no sign of the species except for a hide in the village of Murduwa, below Ringmo. From there we paralleled the northern slopes of the Dhaulagiri Range east to the Kali Gandaki River. Enroute we observed fresh tracks of a female snow leopard and her half grown cub at a spring near our camp site at 5300 m just north of the 5700 m Mu La pass. No sign of bharal was made until one of us (PMH) collected

the horn of a male at 4950 m near Sangda La pass and later found the skull of a male at the entrance of Cha Lungpa Gorge (4600 m). No further evidence of either species was observed on that trek.

On 26 May 1978 we observed and photographed two herds of bharal with 12 and 3 individuals, respectively, between 4600 and 5050 m in an area west of Tilicho Lakes and due north of the Nilgiri-Annapurna massifs. Of interest is that the first group contained one newborn. This coincides with the period of parturition estimated by Schaller (1977). In this same area, PMH collected several snow leopard scats, all of which contained bharal hair. Slightly north, in the village of Kagbeni, we were shown the hide of a bharal and on the north flank of the Thorang La pass, above Muktinath, we observed another herd of 9 bharal at 4800 m. These are previously unrecorded populations east of the Kali Gandaki River. They may represent a southwestern extension of range (see Schaller 1977) or a part of a larger disjunct distribution that continues north in Mustang District. How far east bharal occur along the Annapurna Range is unknown.

In mid-October 1978 we camped on the east slope of the lower Jaljalle spur at 3900 m under a large rock overhang that was used by bharal, evidenced by fresh droppings and shed hair. This is the southernmost range inhabited by this species in east Nepal (Schaller 1977). The Jaljalle lie east of the Arun River and

MISCELLANEOUS NOTES

extend north toward Tibet at elevations of 3500 - 4800 m. The vegetation is both krummholz and alpine while the western flank is blanketed with impassible thickets of dwarf bamboo (*Arundinaria*). We continued north to Sabhai Pokhari with no further sign of bharal. However, visibility was poor and bad weather forced us to return south.

Directly below this area on the upper Milke Danda, we found pugmarks of a large feline at 3650 m which we identified as either those of the common (*L. pardus*) or snow leopard. This is a transitional altitude for both species and the nearby occurrence of bharal, a favoured prey, would suggest that the Jaljalle are inhabited by snow leopard. However, several kilometres south a common leopard was observed (JHC) at close range on the crest of the Milke Danda at 3200 m. Both this and the preceding sightings were in rhododendron (*Rhododendron* spp.) thickets.

Our expeditions attest to the decline and scarcity of Himalayan wildlife. Combined, these treks lasted five months yet the only other large mammals encountered were a jackal (*Canis aureus*), several common langur (*Presbytis entellus*), and two barking deer (*Muntia-*

cus muntjak) in west, central, and east Nepal, respectively. Few populations of ungulates and carnivores in the Himalayan ranges are likely to exist at sustained levels outside of managed parks, preserves, or refuges. The Nepalese government has done a commendable job of establishing representative natural areas for conservation purposes, considering its economic resources. The Jaljalle and Tilicho Lakes areas are uninhabited and may represent critical habitat for bharal and snow leopard. We therefore urge His Majesty's Government and the Office of National Parks and Wildlife Conservation of Nepal to give priority consideration toward gazettement of these areas in planning further conservation programmes.

ACKNOWLEDGEMENTS

We thank Bill Brandenberger and Ridge DeWitt for their good company on these expeditions and our various porters for the excellent services rendered. Robert L. Fleming, Sr. and Jr. greatly added to our enjoyment of Nepal with their insights and hospitality. We also thank Donald R. Johnson for reviewing the manuscript.

PHILIP M. HALL

JACK H. COX, JR.

DEPT. OF BIOLOGICAL SCIENCES,
UNIVERSITY OF IDAHO,
MOSCOW, IDAHO 83843, U.S.A.

NATIONAL CROCODILE PROJECT,
P. O. AMBUNTI,
EAST SEPIK PROVINCE,
PAPUA NEW GUINEA,
March 27, 1984.

REFERENCES

- JACKSON, R. (1979): Snow leopards in Nepal. *Oryx* 15 (2): 191-195.
- MATTHIESSEN, P. (1978): The snow leopard. The Viking Press, N. Y. 338 pp.
- SCHALLER, G. B. (1973): On the behaviour of blue sheep (*Pseudois nayaur*). *J. Bombay nat. Hist. Soc.* 69(3): 523-537.
- _____ (1977): Mountain monarchs: mountain sheep and goats of the Himalaya. Univ. of Chicago Press, Chicago. 425 pp.
- _____ (1979): Stones of silence. The Viking Press, N. Y. 292 pp.